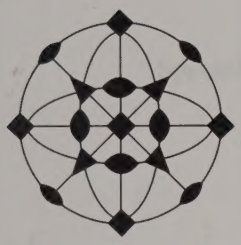
Volume 152, 2000



JSSC

JOURNAL OF SOLID STATE CHEMISTRY

ACADEMIC PRESS

A Harcourt Science and Technology Company

Copyright © 2000 by Academic Press
All Rights Reserved

No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or any information storage and retrieval system, without permission in writing from the Publisher. *Exceptions:* Explicit permission from Academic Press is not required to reproduce a maximum of two figures or tables from an Academic Press article in another scientific or research publication provided that the material has not been credited to another source and that full credit to the Academic Press article is given. In addition, authors of work contained herein need not obtain permission in the following cases only: (1) to use their original figures or tables in their future works; (2) to make copies of their papers for use in their classroom teaching; and (3) to include their papers as part of their dissertations.

The appearance of the code at the bottom of the first page of an article in this journal indicates the Publisher's consent that copies of the article may be made for personal or internal use, or for the personal or internal use of specific clients. This consent is given on the condition, however, that the copier pay the stated per copy fee through the Copyright Clearance Center, Inc. (222 Rosewood Drive, Danvers, Massachusetts 01923), for copying beyond that permitted by Sections 107 or 108 of the U.S. Copyright Law. This consent does not extend to other kinds of copying, such as copying for general distribution, for advertising or promotional purposes, for creating new collective works, or for resale. Copy fees for pre-2000 articles are the same as those for current articles.

0022-4596/00 $35.00

MADE IN THE UNITED STATES OF AMERICA

This journal is printed on acid-free paper.
∞

Contents of Volume 152

Number 1, June 2000

Special Issue on the Design of Solids from Molecular Building Blocks: Golden Opportunities for Solid State Chemistry

Guest Co-Editors: O. M. Yaghi and M. O'Keeffe

PREFACE

Design of Solids from Molecular Building Blocks: Golden Opportunities for Solid State Chemistry O. M. Yaghi, M. O'Keeffe, and M. Kanatzidis 1

SECTION 1: TUTORIAL

Frameworks for Extended Solids: Geometrical Design Principles M. O'Keeffe, M. Eddaoudi, Hailian Li, T. Reineke, and O. M. Yaghi 3

SECTION 2: NEW PERSPECTIVES

Mesostructured Metal Germanium Sulfide and Selenide Materials Based on the Tetrahedral $[Ge_4S_{10}]^{4-}$ and $[Ge_4Se_{10}]^{4-}$ Units: Surfactant Templated Three-Dimensional Disordered Frameworks Perforated with Worm Holes Michael Wachhold, K. Kasthuri Rangan, Ming Lei, M. F. Thorpe, Simon J. L. Billinge, Valeri Petkov, Joy Heising, and Mercouri G. Kanatzidis 21

Building Units Design and Scale Chemistry Gérard Férey 37

Polarity of Organic Supramolecular Materials: A Tunable Crystal Property Jürg Hulliger, Stephan W. Roth, Andrea Quintel, and Hans Bebie 49

Controlling Growth of Novel Solid-State Materials via Discrete Molybdenum-Oxide-Based Building Blocks as Synthons Leroy Cronin, Paul Kögerler, and Achim Müller 57

Formation of Chiral Solids via a Molecular Building Block Approach Vincent L. Pecoraro, Jeffrey J. Bodwin, and Annabel D. Cutland 68

How Solids Can Be Obtained from the Molecular $[Mo_2S_2O_2]^{2+}$ Building Block Francis Sécheresse, Emmanuel Cadot, and Anne Dolbecq 78

Microporous Porphyrin and Metalloporphyrin Materials Margaret E. Kosal and Kenneth S. Suslick 87

SECTION 3: FUNCTIONAL FRAMEWORKS

Structure and γ-Ray-Induced Solid-State Polymerization of Sodium Propynoate: Influence of Bilayer Formation on Solid-State Reactivity J. D. Jaufmann, C. B. Case, R. B. Sandor, and Bruce M. Foxman 99

Novel Extended Solids Composed of Transition Metal Oxide Clusters M. Ishaque Khan 105

Synthesis and Structures of Coordination Polymers with 4,4′-Dipyridyldisulfide Mitsuru Kondo, Mariko Shimamura, Shin-ichiro Noro, Yu Kimura, Kazuhiro Uemura, and Susumu Kitagawa 113

Microporous Materials of Metal Carboxylates Wasuke Mori and Satoshi Takamizawa 120

Covalent Titanium (IV)–Aryloxide Network Materials: 4,4′-Biphenoxide 3D and Polyphenolic 2D Motifs Joseph M. Tanski, Emil B. Lobkovsky, and Peter Wolczanski 130

Solid State Coordination Chemistry in the Design of Molybdenum Oxides: The Hydrothermal Synthesis and Structure of a Layered Copper–Molybdenum Oxide, $[Cu(tpytrz)_2Mo_4O_{13}]$ (tpytrz = tripyridyltriazine) Douglas E. Hagrman and Jon Zubieta 141

A Pillared Three-Dimensional Manganese(II) Coordination Network Containing Rectangular Channels: Synthesis, X-Ray Structure, and Magnetic Properties Wenbin Lin, Owen R. Evans, and Gordon T. Yee 152

New Crystalline Polymers of Ag(TCNQ) and Ag(TCNQF$_4$): Structures and Magnetic Properties Shannon A. O'Kane, Rodolphe Clérac, Hanhua Zhao, Xiang Ouyang, José Ramón Galán-Mascarós, Robert Heintz, and Kim R. Dunbar 159

Two- and Three-Dimensional Mixed-Valence Cu(I)–Cu(II) Coordination Polymers: Syntheses and Characterization of α-, β-[$Cu_2X(C_5H_3N_2O_2)_2(H_2O)$] ($X$ = Cl, Br) Li-Min Zheng, Xiqu Wang, and Allan J. Jacobson 174

Self-Assembly, Structures, and Magnetic Properties of Ladder-Like Copper(II) Coordination Polymers Kil Sik Min and Myunghyun Paik Suh 183

Functional Crystals: Search Criteria and Design Principles Hong Zhang, Ximin Wang, Kecong Zhang, and Boon K. Teo 191

SECTION 4: SUPRAMOLECULAR CRYSTALS

Cavity-Containing Materials Based Upon Resorcin[4]arenes by Discovery and Design Leonard R. MacGillivray and Jerry L. Atwood 199

Structural Properties and Topological Diversity of Polymeric Ag(I)-hexamethylenetetramine Complexes: Self-Assembly of Three Novel Two-Dimensional Coordination Networks and Their Supramolecular Interactions Lucia Carlucci, Gianfranco Ciani, Davide M. Proserpio, and Silvia Rizzato 211

C–H···O and C–H···N Hydrogen Bond Networks in the Crystal Structures of Some 1,2-Dihydro-*N*-aryl-4,6-dimethylpyrimidin-2-ones Meiyappan Muthuraman, Yvette Le Fur, Muriel Bagieu-Beucher, René Masse, Jean-François Nicoud, Sumod George, Ashwini Nangia, and Gautam R. Desiraju 221

Novel Organic–Inorganic Layered Compounds Derived from Simple Coordination Building Blocks: Synthesis and Structural Characterization of $(H_3NCH_2CH_2NH_3)[Fe(C_2O_4)MoO_4]$ and $Fe(H_2NCH_2CH_2NH_2)MoO_4$ Songping D. Huang and Yongkui Shan 229

Assembly of New Coordination Frameworks in a pH-Controlled Medium: Syntheses, Structures, and Properties of $^3_\infty[Cd(Hpdc)(H_2O)]$ and $^3_\infty[Cd_3(pdc)_2(H_2O)_2]$ Long Pan, Xiaoying Huang, and Jing Li 236

Syntheses and Solid-State Structures of Molecular and Extended Silver(I) Complexes of 4-Isocyano-3,5-diisopropylbenzonitrile Ming-Xing Li, Kung-Kai Cheung, and Andreas Mayr 247

Polymorphous One-Dimensional Tetrapyridylporphyrin Coordination Polymers Which Structurally Mimic Aryl Stacking Interactions C. V. Krishnamohan Sharma, Grant A. Broker, and Robin D. Rogers 253

Hydrogen Bond-Directed Hexagonal Frameworks Based on Coordinated 1,3,5-Benzenetricarboxylate C. J. Kepert, T. J. Prior, and M. J. Rosseinsky 261

Alkali Cation Ligating Iodocuprate(I)-Based Coordination Networks with the Thiacrown Ether 1,10-Dithia-18-crown-6 T. Röttgers and W. S. Sheldrick 271

A Neutral "Molecular Railroad" Coordination Polymer That Incorporates Polycyclic Aromatic Molecules: Synthesis and Single-Crystal X-Ray Structure of $[Co(4,4'bipyridine)_{2.5}(NO_3)_2]\cdot 2Phenanthrene$ Konstantin V. Domasevitch, Gary D. Enright, Brian Moulton, and Michael J. Zaworotko 280

Simple Quaternary Ammonium Ions R_4N^+ (R = *n*Pr, *n*Bu, *n*Pen) as Versatile Structure Directors for the Synthesis of Zeolite-Like, Heterobimetallic Cyanide Frameworks Eyck-Michael Poll, Sabine Samba, R. Dieter Fischer, Falk Olbrich, Nicola A. Davies, Paolo Avalle, David C. Apperley, and Robin K. Harris 286

Building Open-Framework Metal Phosphates from Amine Phosphates and a Monomeric Four-Membered Ring Phosphate C. N. R. Rao, Srinivasan Natarajan, and S. Neeraj 302

Number 2, July 2000

REGULAR ARTICLES

Study of the Crystal Structures of Sodium Magnesium and Sodium Nickel Diphosphates Fatima Erragh, Ali Boukhari, Francis Abraham, and Brahim Elouadi 323

Crystal Structure of $Cu_2Gd_{2/3}S_2$: Interlayer Short-Range Order of Gd Vacancies Mitsuko Onoda, Xue-an Chen, Akira Sato, and Hiroaki Wada 332

Order–Disorder and Mobility of Li^+ in the β'- and β-$LiZr_2(PO_4)_3$ Ionic Conductors: A Neutron Diffraction Study M. Catti, N. Morgante, and R. M. Ibberson 340

Synthesis and Structure Determination of the New Compound $La_{\sim 10.8}Nb_5O_{20}S_{10}$ Christine Boyer-Candalen and Alain Meerschaut 348

Metastable Hexagonal Vanadium Molybdate Study Olivier Mougin, Jean-Luc Dubois, François Mathieu, and Abel Rousset 353

Structural Chemistry and Electronic Properties of the Hexagonal Perovskites $BaIr_{1-x}Co_xO_{3-\delta}$ ($x = 0.5$, 0.7, 0.8) Jaap F. Vente and Peter D. Battle 361

Synthesis, Crystal Structure, and Magnetic Order of the Layered Iron Oxycarbonate $Sr_4Fe_2O_6CO_3$ K. Yamaura, Q. Huang, J. W. Lynn, R. W. Erwin, and R. J. Cava 374

Preparation and Crystal Structures of $Ni(NH_3)_2Cl_2$ and of Two Modifications of $Ni(NH_3)_2Br_2$ and $Ni(NH_3)_2I_2$ A. Leineweber and H. Jacobs 381

Magnetic Susceptibility and Local Structure of the Glasses Ga_2S_3(As_2S_3, PbS)–GeS_2–MnS Yu. S. Tver'yanovich, S. Vilminot, S. S. Degtyaryev, and A. Derory 388

Comparative Study of Bismuth Tellurites by Infrared Absorption Spectroscopy Zs. Szaller, L. Kovács, and L. Pöppl 392

An NMR Investigation of Lithium Occupancy of Different Sites in the Oxide Superconductor $LiTi_2O_4$ and Related Compounds J. P. Kartha, D. P. Tunstall, and John T. S. Irvine 397

Synthesis, Structural Studies, and Physical Properties of the $RE_5Mo_{32}O_{54}$ (RE = La, Ce, Pr, Nd) Compounds Containing *trans*-Bicapped Mo_8 Octahedral Clusters and Mo_7–Mo_{10}–Mo_7 Triclusters J. Tortelier, P. Gall, H. Noël, and P. Gougeon 403

Redox Behavior of VI B Transition Metal Ions in Rutile TiO_2 Solid Solutions: An XRD and EPR Study Dante Cordischi, Delia Gazzoli, Manlio Occhiuzzi, and Mario Valigi 412

Paracrystal Formation from $Ni_{1-x}O$ and CaO upon Interdiffusion Mei-Li Jeng and Pouyan Shen 421

Investigation of the Alkaline Earth Phosphates: Synthesis and Crystal Structure of a New Strontium Hydrogen Phosphate Form Lotfi Ben Taher, Leila Smiri, Yvon Laligant, and Vincent Maisonneuve 428

Crystal Growth and Structural Investigations of the Oxygen Ion Conductor $BaBi_3O_{5.5}$ Saeid Esmaeilzadeh, Pedro Berastegui, Jekabs Grins, and Håkan Rundlöf 435

Specific Heat and ac Susceptibility Studies on Ruthenium Pyrochlores $R_2Ru_2O_7$ (R = Rare Earths) Nobuyuki Taira, Makoto Wakeshima, and Yukio Hinatsu 441

Synthesis and Characterization of Functionalized MCM-41 with Copper– and Manganese–Phenanthroline Complexes Shan Zheng, Lian Gao, and Jinkun Guo 447

Structural and Luminescent Properties of a Nasicon-Type Phosphate $Cu^{I}_{0.5}Mn^{II}_{0.25}Zr_2(PO_4)_3$ A. Mouline, M. Alami, R. Brochu, R. Olazcuaga, C. Parent, and G. Le Flem 453

Ba_3SiI_2, a Double Salt of Barium Iodide and the Zintl Phase Ba_2Si Steffen Wengert and Reinhard Nesper 460

Crystal Structure of $Na_2ZnP_2O_7$: Reinvestigation I. Belharouak, P. Gravereau, C. Parent, J. P. Chaminade, E. Lebraud, and G. Le Flem 466

Concerning the $Ca_{2-x}Mg_xTt$ Systems, Tt = Sn, Pb Ashok K. Ganguli, Arnold M. Guloy, and John D. Corbett 474

Crystal Structure and Bonding in the Rare-Earth Rich Ternary Pnictides RE_5M_2X (RE = Y, Gd, Tb, Dy, Ho, Er, Tm, Lu; M = Ni, Pd; X = Sb, Bi) Yurij Mozharivskyj and Hugo F. Franzen 478

Hydrothermal Synthesis of Lanthanum Vanadates: Synthesis and Crystal Structures of Zircon-Type $LaVO_4$ and a New Compound LaV_3O_9 Yoshio Oka, Takeshi Yao, and Naoichi Yamamoto 486

Synthesis and Characterization of New Phases: $Sr_{3.75}K_{1.75}Bi_3O_{12}$ and $Sr_{3.1}Na_{2.9}Bi_3O_{12}$ J. S. Pshirkov, S. M. Kazakov, A. M. Abakumov, S. N. Putilin, E. V. Antipov, C. Bougerol-Chaillout, O. I. Lebedev, and G. Van Tendeloo 492

Structural and Magnetic Properties of Ultrafine $La_{0.7}Ca_{0.3}MnO_z$ Powders Prepared by Mechanical Alloying M. Muroi, R. Street, and P. G. McCormick 503

Synthesis and Crystal Structure of $Ni(VO_3)_2 \cdot 4H_2O$ and α-$Ni(VO_3)_2 \cdot 2H_2O$ E. Baudrin, M. Touboul, and G. Nowogrocki 511

Neutron Diffraction Study of $La_3Ni_2O_7$: Structural Relationships Among $n = 1$, 2, and 3 Phases $La_{n+1}Ni_nO_{3n+1}$ Christopher D. Ling, Dimitri N. Argyriou, Guoqing Wu, and J. J. Neumeier 517

Synthesis and Properties of Spinel-Type Co–Cu–Mg–Zn–Cr Mixed Oxides G. L. Castiglioni, G. Minelli, P. Porta, and A. Vaccari 526

Pressure-Sensitive Modeling of the Reversible Lithiation of Vacant Thiospinel $(In_{0.5}\square_{0.5})[In_{1.5}Sn_{0.5}]S_4$ J.-P. Connerade, J.-C. Jumas, and J. Olivier-Fourcade 533

Synthesis of Nanocrystalline Cobalt Selenide in Nonaqueous Solvent J. H. Zhan, X. G. Yang, S. D. Li, Y. Xie, W. C. Yu, and Y. T. Qian 537

Synthesis, Crystal Structure, and Physical Properties of $Sr_{0.93}(Si_xNb_{1-x})Nb_{10}O_{19}$ ($x = 0.87$) J. Tortelier, T. J. Emge, G. Veith, and M. Greenblatt 540

Structural Characterization of the Engineered Scavenger Compound, H-$Li_2Ti_3O_7$ P. Bordet, C. Bougerol Chaillout, I. E. Grey, J. L. Hodeau, and O. Isnard 546

Synthesis and Structure Determination of $Nd_{16}Ti_5S_{17}O_{17}$ C. Boyer-Candalen, C. Deudon, and A. Meerschaut 554

Indides *Ln*$NiIn_2$ (*Ln* = Pr, Nd, Sm) and Ferromagnetic PrRhIn Vasyl' I. Zaremba, Yaroslav M. Kalychak, Vitaliy P. Dubenskiy, Rolf-Dieter Hoffmann, and Rainer Pöttgen 560

RAPID COMMUNICATIONS

X-Ray Diffraction Pattern Simulation for Thermally Treated [Zn–Al–Cl] Layered Double Hydroxide A. Ennadi, A. Legrouri, A. De Roy, and J. P. Besse 568

A New High-Temperature Cubic Fluorite-Type Phase $Mo_{0.16}Bi_{0.84}O_{1.74}$ with a Rare Three-Dimensional Incommensurate Modulation M. Valldor, S. Esmaeilzadeh, C. Pay-Gomez, and J. Grins 573

Magnetic Order in Perovskite $Pr_{1-x}Ba_xCoO_3$ Studied by Magnetic Circular Dichroism (MCD) Spectroscopy K. Yoshii, M. Mizumaki, Y. Saitoh, and A. Nakamura 577

AUTHOR INDEX FOR VOLUME 152 582

NOTICE

The Subject Index for Volume 152 will appear in the December 2000 issue as part of a cumulative index for the year 2000.